REMARKS

Summary

This Amendment is responsive to the Office Action mailed on August 4, 2003. Claim 57 is amended. Claims 30 to 57 are pending.

As a preliminary matter, Applicants respectfully request that the Examiner acknowledge Applicants' priority claim in the next Official Communication. Applicants' priority documents were submitted with the application on August 2, 2001.

Claims 30-39 and 53-57 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Marshall (US 5,663,978) in view of Takigawa (US 5,844,309).

Claims 40-43 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Marshall in view of Takigawa and De Voe (US 5,766,277).

Claims 44-52 under 35 U.S.C. § 103(a) as being unpatentable over Marshall in view of Takigawa in view of Okoshi (US 5,665,473).

Applicants respectfully traverse these rejections in view of the amended claims and the following comments.

Discussion of Amended Claim

Claim 57 is amended to clarify that the solid state body is a solid-state host crystal doped with a laser active component (see, e.g., Applicants' specification, page 10, lines 8-11). Claim 57 is also amended to specify

that the amplified radiation field is output from a first one of the flat sides of the solid-state host crystal.

Discussion of Marshall and Takigawa

Marshall discloses a diode end-pumped solid-state laser 100. The solid-state laser 100 includes a diode package 1 in which the diode outputs are brought to an output aperture through a metal stub 2 fixed to the side of the package. The stub 2 is placed in immediate proximity, across a small air gap, to a back mirror 5 which is formed on the end of a laser crystal 3. Spaced from across the other end of the crystal 3 is a front mirror 7 supported in a mounting and alignment mechanism 7', such that the mirror 7 and the face 5 define a lasing cavity about the crystal. The pump light 4 emitted from the stub 2 enters the crystal through the back mirror 5 which transmits at the pump wavelength but is highly reflective at the lasing wavelength of the crystal 3 (Col. 4, lines 48-67). The diode array 1 and the laser crystal 3 are both mounted and heat-sunk to a common base plate 10 which in turn is temperature controlled by a thermoelectric or similar cooler assembly 11. A heat sink 12 carries from the cooler 11 and may in turn be actively cooled (Col. 5, lines 4-10).

The structure of the laser 100 of Marshall is substantially different than that of the laser system claimed by Applicants. Marshall does not disclose or suggest a laser amplifying system having solid-state host crystal with two oppositely located flat sides, where the amplified radiation field is output from a first one of

said flat sides and the second of said oppositely disposed flat sides is coupled to a support surface of a cooling membner via an adhesive layer, as claimed by Applicants. In Marshall, laser light 8 is output from one side of crystal 3. The pump beam 4 enters the side of the crystal opposite that which outputs the laser light 8. A third side of the crystal 3 of Marshall, which third side is not opposite the side which outputs the laser light 8, is coupled directly to a base plate 10.

Further, the side of the crystal 3 of Marshall which is opposite the output side (i.e., the side receiving pump beam 4) is not coupled to a support surface of a cooling member, as claimed by Applicant. Rather, the third side of the crystal 3 of Marshall (discussed above) is mounted a common base plate 10, which in turn is temperature controlled by a thermoelectric or similar cooler assembly 11. A heat sink 12 carries heat away from the cooler assembly 11 of Marshall (Col. 5, lines 4-10).

The differences in the structure and arrangement of the laser of Marshall and that of the present invention are readily apparent when comparing, for example, Figure 1 of Marshall and Figure 1 of the present invention.

In addition, the Examiner has acknowledged that Marshall does not disclose an adhesive layer as claimed by Applicants (Office Action, page 2). The Examiner cites Takigawa as "teaching an adhesive layer that comprises a cross-linked adhesive material said adhesive material being of type that is essentially invariant in volume when changing from a liquid into a solid, cross-linked state . . ." (Office Action, page 3).

Takigawa discloses an adhesive composition for a semiconductor device. Takigawa is not related to lasers and in fact does not even mention the term "laser". Therefore, one skilled in the art of laser systems would not look to Takigawa to improve the laser system of Marshall, especially since Marshall does not relate to semiconductor type lasers.

The adhesive layer of Takigawa is used to adhere semiconductor components together while improving the heat release characteristics in the semiconductor device. However, there is no disclosure or suggestion in Takigawa that the adhesive material is of a type that is essentially invariant in volume when changing from a liquid to a solid state as claimed by Applicants. As discussed, for example, at page 2, second paragraph of Applicants' specification, that: "the term 'essentially invariant in volume' may be understood such that the adhesive displays a change in volume of less than 5%, even better less than 2% whilst passing from its liquid state into its solid, cross-linked state". Such an adhesive which is essentially invariant in volume acts to reduce the mechanical stresses on the laser amplifying system. An adhesive having the property of being essentially invariant in volume when passing from a liquid to a solid state hardens without any transfer of substances into the surroundings, i.e. any transfer of water vapor, solvent or volatile chemicals, such as, for example, acetic acid. Since the hardening process takes place essentially invariant in volume the alignment of the solid-state host crystal once achieved relative to the cooling member is essentially retained during the hardening process.

Therefore, with the present invention, no stresses act on the solid-state host crystal in a direction parallel to the second flat side when the adhesive hardens. Thus the solid-state host crystal of the present invention is prevented from becoming unusable on account of the stresses acting in a direction parallel to the second flat side (see, e.g., Applicants' specification, page 1, lines 10-21; and page 16, lines 12-22).

Takigawa is not concerned with any change in volume during the hardening of the adhesive layer. In fact, Takigawa discloses a type of adhesive layer which changes in volume when drying due to evaporation of solvent (see, e.g., Col. 7, lines 16-28; and Col. 7, lines 59-60). Such an adhesive layer is problematic and would lead to stress when used to secure a host crystal to a support surface, as discussed above. Takigawa therefore teaches away from an adhesive material which is essentially invariant in volume when changing from a liquid to a solid state, as claimed by Applicants.

Applicants respectfully submit that the present invention is not anticipated by and would not have been obvious to one skilled in the art in view of Marshall and Takigawa, or any of the other prior art of record.

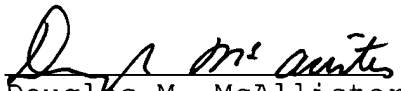
Further remarks regarding the asserted relationship between Applicants' claims and the prior art are not deemed necessary, in view of the foregoing discussion. Applicants' silence as to any of the Examiner's comments is not indicative of an acquiescence to the stated grounds of rejection.

Withdrawal of the rejections under 35 U.S.C. § 103(a) is therefore respectfully requested.

Conclusion

The Examiner is respectfully requested to reconsider this application, allow each of the presently pending claims, and to pass this application on to an early issue. If there are any remaining issues that need to be addressed in order to place this application into condition for allowance, the Examiner is requested to telephone Applicant's undersigned attorney.

Respectfully submitted,



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